Supreme Court, U. S.
FILED
JUL 28 1980
MICHAEL RODAK, JR., CLERK

No. 79-1112

IN THE

Supreme Court of the United States

October Term, 1979

SIDNEY A. DIAMOND, COMMISSIONER OF PATENTS AND TRADEMARKS, *Petitioner*

v.

JAMES R. DIEHR, II and THEODORE A. LUTTON

On Writ of Certiorari to the U. S. Court of Customs and Patent Appeals

BRIEF AMICUS CURIAE FOR THE AMERICAN PATENT LAW ASSOCIATION, INC. IN SUPPORT OF AFFIRMANCE AND/OR REMAND

AMERICAN PATENT LAW ASSOCIATION, INC.
2001 Jefferson Davis Highway
Arlington, Virginia 22202
DONALD R. DUNNER, President

KENNETH E. KUFFNER
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77056
Attorney

Of Counsel:
TRAVIS GORDON WHITE
JOHN D. NORRIS
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77056

Alpha Law Brief Co., One Main Plaza, No. 1 Main St., Houston, Texas 77002

TABLE OF CONTENTS

	Page
I. AUTHORITY TO FILE	1
II. THE APLA AS A FRIEND OF THE COURT IN THE PUBLIC INTEREST	1
A. The Nature of the Amicus Organization	1
B. The Interest of Amicus is the Public Interest in Preservation of the Patent System	2
C. APLA Takes No Position on the Patentable Merits of the Invention Involved in This Application	2
III. PURPOSE OF THIS BRIEF	5
IV. COMMENT ON THE GOVERNMENT'S STATEMENT OF THE ISSUES BEFORE THE COURT	6
V. ARGUMENT	7
A. The Decision Below is Consistent with the Underlying Philosophy in *Benson* and *Flook* that only Practical Applications of Principles of Nature to Produce a Beneficial Result or Effect Should be Eligible for Patent Protection	7
B. The CCPA has Recognized and Applied this Philosophy Consistent with the Holdings in *Benson* and *Flook*	8
C. Where the Claimed Subject Matter as a Whole is Drawn to a Practical Application of a Principle of Nature in a Specific Manner to Produce a Beneficial Result or Effect in One of the Technological Arts, that Subject Matter Should be Eligible for Patent Protection Under § 101	16
D. Conclusion	20

TABLE OF AUTHORITIES

CONSTITUTION

Page

U. S. Const. art. 1, § 8, cl. 8 5

FEDERAL STATUTES

28 U.S.C. § 1542 (1976) 3
35 U.S.C. § 101 (1976) ..... *passim*
35 U.S.C. § 102 (1976) 4, 22
35 U.S.C. § 103 (1976) 4, 22
35 U.S.C. § 112 (1976) 4, 7, 22
35 U.S.C. § 144 (1976) 3

CASES

In re Alul, 468 F.2d 939 (CCPA 1972) 3
In re Arkley, 455 F.2d 586 (CCPA 1972) 3
In re Bergy, 596 F.2d 952 (CCPA 1979) 4
In re Christensen, 478 F.2d 1392 (CCPA 1973) 8, 19
In re de Castelet, 562 F.2d 1236 (CCPA 1977) 9, 19
In re Diehr, 602 F.2d 982 (CCPA 1979) 7, 20
In re Freeman, 573 F.2d 1237 (CCPA 1978)...12, 13, 15, 16, 19, 20
In re Gelnovatch, 595 F.2d 32 (CCPA 1979) 11, 19
Gottschalk v. Benson, 409 U.S. 63 (1972) ..... *passim*
Mackay Radio & Telegraph Co. v. Radio Corp. of America, 306 U.S. 86 (1939) 19
In re Maucorps, 609 F.2d 481 (CCPA 1979) 11
Parker v. Flook, 437 U.S. 584 (1978) ..... *passim*
In re Richman, 563 F.2d 1026 (CCPA 1977) 9, 10, 13-14, 19
In re Sarkar, 588 F.2d 1330 (CCPA 1979) 11, 19
In re Waldbaum, 559 F.2d 611 (CCPA 1977) 9
In re Walter, 618 F.2d 758 (CCPA 1980)...11, 14, 15, 16, 18, 19, 20

No. 79-1112

IN THE

Supreme Court of the United States

October Term, 1979

SIDNEY A. DIAMOND, COMMISSIONER OF PATENTS AND TRADEMARKS, *Petitioner*

v.

JAMES R. DIEHR, II and THEODORE A. LUTTON

On Writ of Certiorari to the U. S. Court of Customs and Patent Appeals

BRIEF AMICUS CURIAE FOR THE AMERICAN PATENT LAW ASSOCIATION, INC. IN SUPPORT OF AFFIRMANCE AND/OR REMAND

I. AUTHORITY TO FILE

This amicus brief is presented under Rule 36. The letters of consent are on file with the Clerk.

II. THE APLA AS A FRIEND OF THE COURT IN THE PUBLIC INTEREST

A. The Nature of the Amicus Organization

The American Patent Law Association, Inc. ("APLA") is a non-profit membership organization of over 4,000

lawyers interested in intellectual property law, that is, patents, trademarks, copyrights, trade secrets and related areas of law. Members of APLA not only practice before the Patent and Trademark Office ("PTO"), but also are concerned with patent litigation, with counseling on infrigement and validity matters, and with licensing or other transfer of patented and non-patented technology.

APLA membership is not restricted to any segment of the profession. Attorneys in private practice and those employed by corporations, universities and government are included. Members of the association and their clients represent widely divergent interests and views. They represent individuals, organized research and development (both academic and commercial), and large and small industrial and business enterprises.

B. The Interest of Amicus is the Public Interest in Preservation of the Patent System

The APLA has expertise in the day-to-day workings of, and the public benefits derived from, the American patent system. Since the broadly based association membership is not divided into plaintiffs' and defendants' bars, APLA is uniquely qualified to speak fairly on the general issues which affect the public interest in preserving the patent system.

C. APLA Takes No Position on the Patentable Merits of the Invention Involved in This Application

The jurisdiction of the Court of Customs and Patent Appeals ("CCPA"), in its review of the decisions of

the PTO tribunals, is limited.[1] This means that the CCPA decision in the case presently under review must *NOT* be considered as a conclusion that a patent should issue.[2] The CCPA decided *ONLY* that the PTO was wrong in rejecting all claims in the applications for being outside the categories of subject matter eligible for patent protection[3] as set forth in 35 U.S.C. § 101

---

1. While 28 U.S.C. § 1542 states broadly that the CCPA "shall have jurisdiction of appeals from decisions of" the Patent and Trademark Office, the patent statute requires that the court "shall hear and determine such appeal on the evidence produced before the Patent and Trademark Office, *and the decision shall be confined to the points set forth in the reasons of appeal.*" 35 U.S.C. § 144 (1976) (emphasis added). The policy of the CCPA in this regard is well summarized in the following passage from *In re Alul,* 468 F.2d 939, 941 (CCPA 1972):

> We note that a substantial part of the solicitor's brief is devoted to arguments which were not raised below and which are tantamount to new grounds of rejection. The practice of raising such matters at this stage of the prosecution is unfair to the other party, adds to the burden of the court, and serves to obscure the raising party's position on the issues that actually were raised below. We will not consider these new arguments. We realize the position this leaves appellants in, but we are confident that if any merit were found in the new arguments in cases like this, the Patent Office would reopen prosecution to assert them and give appellants a chance to respond to them.

2. "It is the Patent Office which grants patents, not this Court." *In re Arkley,* 455 F.2d 586, 589 (CCPA 1972).

3. It is critical that the Court understand the distinction we make in this brief between the issue of whether claimed subject matter *is eligible for patent protection,* on the one hand, and the issue of whether claimed subject matter *satisfies the conditions for patentability, i.e.,* is new, useful and nonobvious, and thereby merits the grant of a patent, on the other hand. It is the former issue only which is before the Court because that is the only ground on which the PTO chose to finally reject the application here involved and the application in the companion case, *Diamond v. Bradley* (No. 79-855). The APLA agrees that inquiry as to either issue must consider the claimed subject matter *in its entirety,* but emphasizes that each inquiry must be made separately and independently of the other.

(1976). No other issues were before the CCPA. In each case the agency chose not to pursue any other ground for rejection, and that court thus could not consider questions related to the novelty or nonobviousness of the claimed subject matter.

The APLA believes that value judgments as to whether these respondents should or should not ultimately be *entitled to* a patent[4] have no proper place in deciding whether the subject matter which respondents seek to have patented is *within the statutory categories which are eligible for* the patent grant. While taking no position on whether the application now before the Court satisfies the various statutory requirements and conditions for patentability,[5] the APLA fully supports the holding of the CCPA that the claims of this application define subject matter which is eligible for patent protection under § 101 of the statute.

Cf. In re Bergy, 596 F.2d 952, 959 (CCPA 1979), wherein the CCPA expressed its concern regarding the

> commingling of distinct statutory provisions which are conceptually unrelated, namely, those pertaining to the *categories* of inventions in § 101 which *may* be patentable and to the *conditions* for patentability demanded by the statute for inventions within the statutory categories, particularly the nonobviousness condition of § 103.

4. We are concerned that the apparent relative simplicity of the Diehr and Lutton invention, coupled with the manner in which the government has developed its argument, may persuade some justices that the CCPA ruling should be reversed simply on the ground that a patent ought not to issue on this particular application. Alternatively, some might conclude that to affirm the ruling of the CCPA will result in the issuance of many patents where the only novelty of the invention involved lies in the use of a programmed computer. We urge the Court to be clear that an affirmance of a CCPA decision does not mandate that even the application which is before the Court issue as a patent.

5. 35 U.S.C. §§ 102, 103 and 112 (1976), in particular.

III. PURPOSE OF THIS BRIEF

The public interest in an effective patent system demands a broader view of the issues than that provided by the petitioner, which appears to be largely reflective only of administrative problems in the PTO.

The government's briefs urge an approach to claim analysis — having potential application beyond the specific area of computer program-related inventions — which could severely undermine the patent system itself.

The government seeks in this case, as it did in *Gottschalk v. Benson,* 409 U.S. 63 (1972), and *Parker v. Flook,* 437 U.S. 584 (1978), and as it does in *Diamond v. Bradley* (No. 79-855), to have the Court foreclose the granting of patents for all inventions involving computer programming. This attempt is at odds with the constitutional purpose behind our patent system, *i.e.,* "to promote the Progress of . . . the useful Arts."[6] In this technology, as in all others, it is a socially desirable goal, effectively implemented by our patent system, to induce and to encourage by patent grant the disclosure of new and useful information and the commitment of capital to research and development.

In its brief to this Court, the government accuses the CCPA of "summarily dismissing" (Pet. Br. at 10) the majority opinion in *Flook,* and following the approach of the dissenting opinion in refusing "to identify and set aside, as had the Board, those steps in the claim that were old in the art" (*id.* at 5), and to "identify respondents' computer program as the only novel feature of

---

6. U.S. Const. art. 1, § 8, cl. 8.

their invention" (*id.* at 11). The CCPA's decision that respondents' claims recited statutory subject matter comports, says the government, with that court's persistent criticism of *Flook*" (*id.*, citing a single opinion).

It is a major purpose of this brief to persuade the Court that the decision of the CCPA in this case is *not* inconsistent with the holdings in *Benson* and in *Flook*. Rather, it is based upon a reasoned approach, consistent with those cases and with the aims of the patent system, whereby claimed subject matter involving computer-related or mathematics-related concepts may be tested to determine whether it is eligible for patent protection.

IV. COMMENT ON THE GOVERNMENT'S STATEMENT OF THE ISSUES BEFORE THE COURT

The Petition in this case presents the question as:

> Whether a computer program that regulates the curing time of rubber products in a mold is patentable subject matter under 35 U.S.C. 101.

This question suggests that the application before the Court is seeking to patent a computer program, which could not be further from the truth. We ask the Court to compare "the question" presented with the actual language of the application claims. Respondents here are not claiming a "computer program." In fact, respondents have pointed out not only that they are *not* claiming computer programs, but also that they have never intended to do so.[7] Nor did the CCPA, in reversing

7. For more than 100 years the patent statutes have required each patent applicant to "particularly point out and distinctly claim

the decision of the PTO, determine the subject matter of this application to be a computer program.[8]

It is a fact, however, that the invention of these claims *does* require, in its practical application, the *use* of a programmed computer, and the claims now before the Court make reference to this fact. The question presented by the government, however, focuses on this point alone, through an exercise which ignores what the patent applicants are seeking to patent and what the court below found to be defined by the application claims. The "how" and "why" of this exercise, its basic impropriety, as well as its insidious danger to the constitutional underpinnings of our patent system, is the principal focus of APLA's brief in *Diamond v. Bradley,* No. 79-855, filed concurrently herewith.

V. ARGUMENT

A. The Decision Below is Consistent with the Underlying Philosophy in Benson and Flook that only Practical Applications of Principles of Nature to Produce a Beneficial Result or Effect Should be Eligible for Patent Protection

In our brief in *Diamond v. Bradley,* No. 79-855, filed concurrently herewith, we set forth the Association's position that a rational philosophy can be found, underlying the decisions in *Benson* and in *Flook,* which is

---

the subject matter he regards as his invention." This requirement continues in the present statute in the second paragraph of 35 U.S.C. § 112 (1976).

8. The CCPA characterized the claimed invention as "a method for operating molding presses used in the manufacture of rubber articles." *In re Diehr,* 602 F.2d 982, 983 (CCPA 1979).

consistent with past decisions of this Court and which supports the constitutional goals of our patent system. We further point out that the artificial "two-step" approach to claim analysis proposed by the government is not supported by this philosophy. Many predicates underlying the position we take in this brief are set forth in our *Bradley* brief and not repeated here. We urge the Court to read these two briefs together and consider the position we take in each as applicable to both cases.

The CCPA decision in the present case was based upon that court's focusing on the entirety of the claimed subject matter and concluding that, when so viewed, respondents' claims "were not essentially for a method of calculation or formula . . . but for an improved process . . . ." Pet. Br. at 11. As such, the decision below was entirely consistent with the philosophy we set forth in our *Bradley* brief.

In the remainder of this brief, we will outline the CCPA's eight-year, twenty-case "struggle" to develop an approach to claim analysis which is consistent with both the decisions in *Benson* and *Flook* and with the philosophy underlying those decisions.

B. The CCPA has Recognized and Applied this Philosophy Consistent with the Holdings in Benson and Flook

The CCPA quickly recognized the implications of *Benson,* and regularly applied them to affirm PTO decisions holding claimed subject matter non-statutory. The first of these post-*Benson* cases was *In re Christensen,* 478 F.2d 1392 (CCPA 1973), wherein the claimed invention was for a method of determining the porosity

of an underground formation. The recited method involved a computation step using a newly-developed mathematical equation which was to be solved to compute the porosity of the formation after values for the parameters to be used were established according to antecedent steps admittedly old in the art. The CCPA affirmed the PTO's decision rejecting these claims as non-statutory subject matter. That court concluded that the addition of old and necessary antecedent steps of establishing values for the variables in a newly discovered mathematical relationship would not convert an otherwise non-statutory mathematical algorithm into statutory subject matter.

Subsequently, in *In re Waldbaum,* 559 F.2d 611 (CCPA 1977), *In re de Castelet,* 562 F.2d 1236 (CCPA 1977) and *In re Richman,* 563 F.2d 1026 (CCPA 1977), the court continued to apply and to extend the holding in *Benson,* affirming the rejection, as non-statutory subject matter, of claims which clearly recited and preempted mathematical algorithms in the abstract. In *Waldbaum,* the court made clear that it would not consider the mere recitation, in the preamble of the claim, of an intended end use or environment of application for the algorithm to affect the basic non-statutory nature of the claim. In *de Castelet,* the claimed method was expressly stated to be machine-implemented, but was held to be nothing more than the calculation of a mathematical algorithm. In analyzing the rationale of *Benson,* the court stated as follows:

> The type of problem facing the Supreme Court in *Morse, The Telephone Cases,* and *Benson,* was described by one commentator over a hundred years ago, as "how far a discovery or invention

> which may first disclose and practically embody some truth in physics or some law in the operation of the forces of nature, for a useful purpose, is capable of being carried in the exclusive privileges secured by the grant of letters patent," Curtis, A Treatise on the Law of Patents for Useful Inventions § 124 (4th ed. 1873). Recent authority is in accord. See 1 Deller's Walker on Patents § 23 (1964).
>
> It is thus clear that the "nutshell" language of *Benson* expressed the ancient rule that *practical application remains the key*. Because it did not consider the performance of an algorithm by a computer as constituting a practical application of that algorithm under the rule, the Court must have viewed Benson's claims as effectively claiming the "effect," principle, or law or force of nature (the algorithm) itself.

562 F.2d at 1243 (emphasis added). In an earlier footnote, the court had pointed out that

> it is important to distinguish between situations in which (1) the scientific truth per se constitutes the sum of the subject matter sought to be patented, and (2) the scientific truth is merely used in an overall process or to describe a physical relationship.

562 F.2d at 1241n.3.

In *Richman,* the court again found a preamble recitation of an intended end use application, limiting the mathematical algorithm recited in the claims to a particular environment, insufficient to change the fact that the claim in its entirety was drawn to a mathematical expression of scientific truth. "The decisive factor is whether a claimed method is essentially a mathematical calculation." 563 F.2d at 1030. This case is particularly

noteworthy because the claims in question were held non-statutory *even though* they included apparently new and nonobvious procedures for acquiring data for use in the mathematical formulae recited.

The CCPA has continued to apply *Benson* in the same manner, affirming rejections under § 101 in *In re Sarkar,* 588 F.2d 1330 (CCPA 1979), *In re Gelnovatch,* 595 F.2d 32 (CCPA 1979), *In re Maucorps,* 609 F.2d 481 (CCPA 1979) (wherein the court stated that *Benson* applies equally whether an invention is claimed as an apparatus or as a process), and, most recently, in *In re Walter,* 618 F.2d 758 (CCPA 1980).

Since this Court's decision in *Benson,* the CCPA has decided some twenty cases in which it addressed the issue of whether claims involving mathematical equations or computer programs were within the categories of patentable subject matter set forth in § 101. Each case presented an entirely different set of facts, some inventions involving complex subject matter (such as that involved in the Bradley and Franklin application) while others were more easily understood (such as in the Diehr and Lutton application). Chief Judge Markey in his dissenting opinion in *Gelnovatch* succinctly pointed out the problem that the CCPA has had in dealing with these cases:

> Efforts to follow precedent in "computer program" type cases require repeated wrestling with the interpretation and effect of such terms as "program," "mathematical formula," "algorithm," "solution," "equation," and "calculation." . . . In *Benson,* some of those terms were used interchangeably.

595 F.2d at 45.

While this Court was considering the *Flook* case, the CCPA came down with an opinion in which it suggested a reasoned approach, consistent with this Court's decisions in *Benson* and in prior cases, to determine whether a claim to computer program-related subject matter is eligible for patent protection under 35 U.S.C. § 101. In *In re Freeman,* 573 F.2d 1237, 1245 (CCPA 1978), that court stated the following two-step inquiry (not to be confused with the government's two-step approach):

(1) Does the claim directly or indirectly recite[9] an algorithm in the *Benson* sense of the term?

(2) Does the claim in its entirety wholly preempt that algorithm?

A negative response to either of the two questions would necessarily take the claim outside the *Benson* holding. Rejection of the claim on the ground that it defined non-statutory subject matter would thus be improper.

Step (1) of the *Freeman* test (Does the claim recite an algorithm?) recognizes that a claim cannot preempt a mathematical algorithm or law of nature unless it recites it. A claim which recites nothing more than a mathematical algorithm, as was said to be the case in *Benson,* or which clearly contains mathematical terms, is of course the easy case. However, the *Freeman* test also recognizes that a mathematical relationship or method of calculation may be implicit in the language

---

9. The CCPA discussed its meaning of the word "recite" in *Freeman,* 573 F.2d at 1246:

> In some claims, a formula or equation may be expressed in traditional mathematical symbols. . . . Other claims may use prose to express a mathematical computation or to indirectly recite a mathematical equation or formula by means of a prose equivalent therefor.

of the claims even though the formula or mathematical relationship is not expressly recited in mathematical symbols. If the step (1) inquiry does not yield a "yes" answer, there is no need to proceed to step (2). The claim could never be an attempt to preempt a mathematical relationship if none is present. On that basis, the claim would be statutory.

Step (2) of the *Freeman* test was formulated in response to the mandate by this Court in *Benson*. A claim which "would wholly preempt the mathematical formula and in practical effect would be a patent on the algorithm itself" is not patentable subject matter within the meaning of § 101. 409 U.S. at 71. Thus, the inquiry of step (2) of the test it to determine if the claim in practical effect wholly preempts the mathematical algorithm or relationship found in step (1).

The CCPA continued to approach the issue of whether a computer-related claim defined statutory subject matter by means of this so-called *Freeman* analysis, even after this Court handed down its decision in *Flook*.

In its first considerations of *Flook*, the CCPA apparently viewed the holding in that case as coming under step (2) of the *Freeman* analysis. That is, the CCPA considered the holding in *Flook* to be an affirmation of the correctness of its pre-*Freeman* decision in *In re Richman, supra*, wherein the court held that a method of calculating values for parameters to be used in a mathematical relationship was non-statutory despite the recitation in the claim preamble that the relationship was to be applied in an airborne doppler radar system.[10] Applica-

10. In *Richman* the CCPA stated that "if a claim is directed essentially to a method of calculating, using a mathematical formula,

tion of step (2) of the analysis consistent with the *Flook* opinion became impossible in all situations, however, so the CCPA refined its *Freeman* analysis to bring it more in line with the holding in *Flook,* while at the same time keeping the analysis consistent with its own past decisions and especially with prior holdings of the Supreme Court. In *In re Walter,* the CCPA held:

> Once a mathematical algorithm has been found, the claim *as a whole* must be further analyzed. If it appears that the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims), the claim being otherwise statutory, the claim passes muster under § 101. If, however, the mathematical algorithm is merely presented and solved by the claimed invention, as was the case in *Benson* and *Flook,* and is not applied in any manner to physical elements or process steps, no amount of post-solution activity will render the claim statutory; nor is it saved by a preamble merely reciting the field of use of the mathematical algorithm.

618 F.2d 758, 767 (CCPA 1980) (footnotes omitted). This analysis comes from a recognition that the issues under §101 in the area of computer-arts inventions "have arisen because the function of the computer has been to perform mathematical operations." *Id.* at 764. As the CCPA now[11] sees it:

---

even if the solution is for a specific purpose, the claimed method is non-statutory." 563 F.2d at 1030. Compare this with *Flook,* 437 U.S. at 595n.18 and accompanying text.

11. *In re Walter,* 618 F.2d at 764.

> In the computer arts, § 101 problems tend to center around the use of mathematics in the claims, which define the invention for which patent protection is sought. This is a natural consequence of the nature of computers. A computer is nothing more than an electronic machine. It is characterized by its ability to process data, usually by executing mathematical operations on the data at high speeds. By virtue of the speed with which computers operate, they are capable of executing complex or otherwise time-consuming calculations in fractions of a second. Their use in technology is analogous to the use of mechanical devices, such as levers, which provide mechanical advantage in inventions of a mechanical nature; they make possible, or practicable, the solution of mathematical problems which are impractical to solve manually due to the inordinate amount of time manual solution would consume.

The CCPA's recognition that most of the problems with regard to computer-related inventions stem from the mathematical nature of the subject matter makes it even more apparent how that court sees *Benson* and *Flook* as consistent with prior Supreme Court precedents speaking on the application of the patent laws to newly discovered natural principles. *Benson, Flook,* and the CCPA's *Freeman-Walter* analysis thus hold that pure mathematical relationships are nothing more than natural phenomena, which they say should not be the subject of patent protection — even if those relationships have never been discovered or appreciated before and despite their having to be implemented by an incredibly rapid machine. Claims which attempt to wholly preempt such a newly-discovered mathematical relationship, either directly or indirectly, are thus seen to take from the

public a right which it would otherwise be entitled to enjoy. Even when the claim recites a specific technological environment of use, the *Freeman-Walter* analysis would require it to do more than simply present the mathematical relationship and solve it (or otherwise perform some mathematical exercise with it) in order to satisfy § 101. Computer implementation of the mathematical calculations, without more, is not seen as that implementation or application of the scientific principle to a readily ascertainable and specific practical end use for which the patent system was constitutionally created.

On the other hand, the mere fact that a mathematical relationship is recited, even if it is the only point of novelty in the claim, and even if it can only be practically implemented by computer, should not remove a claim from eligibility for patent protection *if that claim otherwise is drawn to a practical application or implementation of the mathematical relationship to produce a specific beneficial result or effect in one of the technological arts.*

C. Where the Claimed Subject Matter as a Whole is Drawn to a Practical Application of a Principle of Nature in a Specific Manner to Produce a Beneficial Result or Effect in One of the Technological Arts, that Subject Matter Should be Eligible for Patent Protection Under § 101

Computer program-related cases decided by this Court and by the CCPA can be categorized according to the nature of their claims as follows:

(1) Claims directed at preempting mathematical algorithms which are to be implemented on a pro-

grammed computer or for which computer implementation is the only practical application; and

(2) Claims which recite the *use* of a programmed computer in carrying out one or more steps in a process claim, or performing the function of one or more of the elements of an apparatus claim.

As a result of those prior decisions of this Court and of the CCPA, the subject matter of inventions found to be in class (1) above will always be non-statutory. But for inventions in class (2) above, the matter will never be so clear-cut. In this category, there is no clear dividing line separating subject matter which is eligible for patent protection from that which is not. The Court previously acknowledged this fact when it said, "The line between a patenable 'process' and an unpatentable 'principle' does not always shimmer with clarity." *Flook,* 437 U.S. at 589.

What then, in terms of 35 U.S.C. § 101, is a *permissible* use of a principle of nature—the recitation of which in a patent claim will "transform an unpatentable principle into a patentable invention"? It is only when that inquiry is on the entirety of *what* is protected by the claim that that question can be answered. Focusing on exactly *what* is protected by the claim will permit further inquiry into how each element (step) interacts with the other elements in the claim to define the function performed by the invention. Understanding this interaction will better enable the determination of whether or not the claim is seeking to protect the principle itself.

The Court in *Benson* and *Flook* dealt only with computer-implemented mathematical algorithms. The claim in *Benson,* directed to all uses of the BCD-to-Binary con-

version method, was held to be an attempt to preempt in its entirety the algorithm itself. The claim in *Flook* was held to cover essentially nothing but a mathematical exercise, the end product of which was a pure number. Neither of those cases holds or requires that a claim be rendered non-statutory simply because a mathematical algorithm is involved.[12] We submit that this is because the Court, in those two cases, implicitly recognized that claims which are not merely directed to a principle of nature (of which mathematical expressions or algorithms are but one kind), but rather are directed to a specific, beneficial end use of the principle,[13] must be considered as proper subject matter for patent protection. Thus, any inquiry into statutory subject matter within the meaning of § 101 must consider the claimed subject matter in its entirety in order to determine if a principle of nature is being applied in a specific manner to achieve a beneficial result in the technological arts.

In *Walter, supra,* the CCPA addressed the difference in the preemption requirement between the *Benson* and the *Flook* holdings by restating the second step of the *Freeman* test in terms other than preemption. As restated in *Walter,* 618 F.2d at 767, the CCPA's test now asks:

(1) Does the claim directly or indirectly recite an algorithm in the *Benson* sense of the term?

(2) If the answer to step (1) is yes:

(a) Does the mathematical algorithm, which is implemented in the specific manner, define a

12. "Yet it is equally clear that a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm." *Flook,* 437 U.S. at 590.

13. Such as, for example, the computer-controlled improved automobile carburetor which is referred to in our *Bradley* brief.

structural relationship between the physical elements of the claim (in apparatus claims) or refine or limit claim steps (in process claims), or

(b) Is the mathematical algorithm found in step (1) merely presented and solved by the claimed invention and not applied in any manner to physical elements or process steps?

The CCPA's *Freeman-Walter* approach appears to be a workable one. Under this analysis, claims which define nothing but the mathematical algorithm, as in *Benson*, even those which define a specific technological environment of intended application, such as those in *Waldbaum*, *de Castelet*, and *Walter*, will be immediately rejectable. Those which include preliminary determinations of values (*Christensen* and *Richman*) and which essentially do nothing more than calculate, solve, compare or correlate according to the mathematical relationships set forth (such as in *Christensen*, *Flook*, *Richman*, *Sarkar* and *Gelnovatch*) will similarly fail to define subject matter eligible for patent protection.

On the other hand, claims which include the required *application* of a principle to obtain a beneficial result should clearly meet the test to define statutory subject matter. Such claims might, for example:

> *Employ* a mathematical principle or algorithm *to define a structural relationship* between one or more physical elements of the claimed subject matter (as the mathematical expression for the angular separation of the antenna elements in *Mackay Radio*);[14] or

14. *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86 (1939).

> Employ a mathematical relationship *to define and limit the function* of one or more elements of a mechanical combination (such as the algorithm embodied in the firmware of the fourth means in *Bradley*) or one or more steps of a method (such as the Arrhenius equation for calculating the curing time for rubber products in *Diehr*);[15] or
>
> *Apply* the information or data obtained from the solution of the mathematical relationships involved, *in specific, defined subsequent steps,* to produce the required practical beneficial result or effect.

The *Freeman-Walter* analysis is in harmony with present statutory provisions and judicial decisions and is adequate to permit an analysis of all computer program-related inventions. We submit that it is a proper threshold approach to the § 101 inquiry. Most importantly, it requires a consideration of the invention as a whole, and does not artificially ignore claim language. As such, it is a most effective means to determine whether a claim which recites a mathematical algorithm or other phenomenon or principle of nature does so in a manner which would preempt *only* the use of the algorithm, phenomenon or principle in a specific manner to achieve a beneficial result or effect in one of the technological arts.

D. Conclusion

We have asked the Court to compare the "question" on which the government sought certiorari with the actual language used in the claims of the application before the

---

15. As we more fully demonstrate in attached Appendix A, both the Bradley et al. and the Diehr et al. inventions, *as claimed,* satisfy this inquiry and, therefore, should be considered as within the statutory categories of inventions eligible for patent protection.

Court. If this question is presented by this case, it can only be through a process of analysis which *ignores* the clear language of the claims, *ignores* decades of customary procedure, and *ignores* a long legal history of repeated insistence by the CCPA on specific application of the statutory language of the patent code in making rejections of an applicant's claims for patent protection. If this question is presented, it can only be by a claim dissection process which uses the meat axe, not the probing scalpel—a process which destroys the basic framework of the claims and changes them beyond recognition.

The applicants here are not claiming a "computer program." Nor does this case involve any attempt to "word" a claim through use of the draftsman's skills to make it appear as if it is drawn to something else when it in fact covers nothing but a computer program. If these claims are considered in their entirety, it is clear that no "principle," or abstract proposition, will be preempted by any patent which may issue. Rather, what will be patented will be a very practical, very beneficial *application* of programmed data processors to produce a desirable, beneficial result in one of the technological arts. The disclosure of these types of inventions is precisely what our patent system was intended to encourage.

As we have shown in our brief in *Bradley,* the logic of the position being asserted by the government will result in a rule which could strike down many meritorious inventions and which could lead to the non-disclosure of previously unknown or unappreciated principles and phenomena of nature. This cannot be the intent of the Court.

The APLA urges the Court to recognize that the CCPA's reasoned approach to analyzing computer-re-

lated and mathematics-related claims is consistent with this Court's holdings in *Benson* and *Flook* and should be upheld. Patent claims involving computer programs can be analyzed according to the principles expressed in the existing case law from the CCPA and from this Court without having to rely on Congress to act.

The judgment below, in its holding that § 101 is not a proper basis for rejecting this application, should be affirmed. Additionally, or in the alternative, if the Court deems it appropriate, this case should be remanded to the PTO for further consideration, consistent with the Court's opinion, of any remaining questions under §§ 102, 103 and 112 of the patent statute.

Respectfully submitted,

AMERICAN PATENT LAW
ASSOCIATION, INC.
2001 Jefferson Davis Highway
Arlington, Virginia 22202
DONALD R. DUNNER, President

KENNETH E. KUFFNER
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77056
Attorney

Of Counsel:

TRAVIS GORDON WHITE
JOHN D. NORRIS
ARNOLD, WHITE & DURKEE
2100 Transco Tower
Houston, Texas 77056

Arlington, Virginia

July _____, 1980

APPENDIX A

Both the Bradley et al. and Diehr et al. Inventions Should be Eligible for Patent Protection

Bradley

Claim 1 of the Bradley and Franklin application reads as follows:

1. In a multiprogramming computer system having a main memory, a central processing unit (CPU) coupled to said main memory, said CPU controlling the state of a plurality of groups of processes being in a running, ready, wait or suspended state, said computer system also having scratchpad registers being accessible to an operating system for controlling said multiprogramming computer system, a data structure for storing coded signals for communicating between said processes and said operating system, and said scratchpad registers, said data structure comprising:

(a) first means in said data structure and communicating with said operating system for storing coded signal indicative of an address for a selected one of said processes;	[the "RPW" word location in the system base]
(b) second means in said first means for storing coded signals indicating priority of said selected one of said processes in relation to others of said processes for obtaining control of said CPU when ready;	[the "PRI" field of the RPW word location of the system base]

(c) third means in said data structure and communicating with said operating system, for storing coded signals indicative of an address for a selected one of said plurality of groups of processes, and,	[the "J and G" table words of the system base]
(d) fourth means coupled to said data structure and said scratchpad registers, for generating signals causing the changing of information in said data structure and said scratchpad registers.	[the microcode for implementing the function of the switch system base instruction, stored as firmware in the control store of the CPU]

The combination claimed by *Bradley* comprises a first means (the RPW word) for providing the address of a selected process within a group of processes; a second means within the first means for specifying the priority of that selected process; a third means for providing the address of a selected group of processes that contains as one of its processes the selected process of the first means; and a fourth means—the firmware—for changing the data in the data structure (including the first, second and third means) and the scratchpad registers. The third means provides an address for the selected group of processes that contains the selected process that will be in the running state. The first means provides an address which will be used with the address of the third means to locate the starting address within the selected group of processes of the instructions that will be fed to the CPU execution circuits. The function performed by the fourth means is shown in the functional flow diagrams of Figures 15b and 15c.

To consider the subject matter patentability of this claim, the operations contained in the firmware of the fourth means must be considered as though they were positively recited in the fourth means of the claims. This does not constitute "reading in" a limitation to the claim that otherwise was not already contained therein, for this procedure is expressly permitted by § 112 ¶ 6 of the patent statute.

Step (1) of the *Freeman-Walter* analysis requires, considering the claim as a whole, a determination whether a mathematical algorithm is directly or indirectly recited in the claim.

It is clear that the first, second and third means of claim 1 do not recite or constitute a prose equivalent of a mathematical algorithm. The government has argued before the CCPA and in its Petition to this Court that the first three means of claim 1 in *Bradley* are hardware elements for storing coded digital information, and that these elements are old and well-known in the art. Thus, if a mathematical algorithm is to be found recited in claim 1, it must be embodied in the function performed in the microcode firmware of the fourth means.

We have previously pointed out that it is the government's position, and on this point we agree, that where a computer program is involved, "the *proper inquiry* is whether *the program* . . . expresses a phenomenon of nature, mental process or an abstract intellectual concept" (emphasis added). However, the government contends with the same breath that *Bradley's* program is nothing more than the expression of an "abstract intellectual concept" because it constitutes "a set of directions . . . for

the switching of data . . . *untied to any practical end use.*" *Bradley* Pet. at 12. We do not agree.

At most, the government could argue that the claim fails to particularly point out and distinctly recite the "practical end use" for the changing of data in the data structure. It is absurd to contend that the switching of data between the image system base and the system base to change the data in the data structure is an "abstract intellectual concept." Any person of ordinary skill in the multi-programming computer art will appreciate that changing the data in the system base and the scratchpad registers can affect the control of the execution of the processes. There is therefore a very "practical end use" implicit in the claim, although the beneficial end use could be better recited.

Looking to the function performed by the fourth means of claim 1 illustrated in Figures 15b and 15c of the application, it is evident that a transfer of the data in each image memory location to its corresponding system base memory location, including the updating of the contents of the scratchpad registers with the new G table word, J table word and the IPQW (internal process queue word; see Figure 6) from the image system base, is all that is performed. The government contended before the CCPA that multiplying by 16 the address in the G and J table word locations of the system base, prior to loading these addresses into the scratchpad registers, converted the functions performed by the firmware of the fourth means, and therefore, claim 1, into a mathematical algorithm in the *Benson* sense. With this, we cannot agree.

Multiplying the base data of the G and J table words by 16 is equivalent to shifting each bit of the base data

of those word locations four bit locations in the direction to increase the magnitude of the absolute address obtained thereby. The function of this address shift is dictated by the architecture of the machine, and is only incidental to the function intended by the microprogram. *Bradley* is not attempting to preempt base address changing by shifting the data four places to obtain a new address.

It is therefore clear that claim 1 does not recite, directly or indirectly, a mathematical algorithm. Step (1) of the *Freeman-Walter* two-step test is not satisfied. There is no need to proceed to step (2). So long as the claim is otherwise statutory, the claim cannot be "drawn to" a mathematical algorithm, since none is recited.

If non-mathematical, but otherwise abstract, algorithms are also to be included within this analysis, the *Bradley* subject matter would still be found statutory. Proceeding with the next portion of the inquiry, it becomes readily apparent that when considered as a whole each *Bradley* claim defines a specific, practical implementation of the abstract principle involved to define and limit both the structure and the function of the claimed subject matter so that it performs a very useful, valuable operation within the digital computer. Step (2) of the inquiry asks the question—is the abstract principle, such as the mathematical algorithm found in step (1), merely presented and solved by the claimed invention and not applied in any manner to physical elements or process steps? The answer to this question is clearly no. Any algorithm, mathematical or otherwise, contained in the firmware of the fourth means of claim 1, so interrelates with the other physical elements of the claim that it clearly defines a limited, specific and practical application of the algorithm

to produce a beneficial result or effect in one of the technological arts. Enabling the user programmer to transfer control of program execution in a multi-programming computer system by transferring an image base, altered by the user's computer program, to the system base and scratchpad registers is a very beneficial and practical application. Step (2) of the inquiry would be satisfied whether or not there is a mathematical algorithm in the fourth means of claim 1.

Diehr

Claim 1 of the Diehr and Lutton application is representative of the *Diehr* process:

1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:

providing said computer with a data base for said press including at least,

natural logarithm conversion data (ln),

the activation energy constant (C) unique to each batch of said compound being molded, and

a constant (x) dependent upon the geometry of the particular mold of the press,

initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure, [elapsed time]

constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding, [measuring the temperature]

constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is [calculating the ideal cure time using the Arrhenius equation]

$$\ln v = CZ + x$$

where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and [comparing for equivalence between elapsed time and ideal time]

opening the press automatically when a said comparison indicates equivalence. [opening mold when equivalence found]

The function performed in each step of the claimed method is clearly presented and there is no need here to elaborate.

Mathematical formulae and equations have long been recognized as expressions for principles of nature. There is no other answer to our inquiry under step (1) of the *Freeman-Walter* analysis but that claim 1 of Diehr recites a principle of nature in the form of a mathematical algorithm—the Arrhenius equation. Step (1) is therefore satisfied, and we proceed to the second step of the test.

The inquiry under step (2) of the test seeks to determine if the mathematical algorithm found in step (1)

is merely presented and solved by the claimed invention and is not applied in any manner to physical elements or process steps, or is the claim drawn to a limited, specific, and practical application of the mathematical algorithm to produce a beneficial result or effect in one of the technological arts. The Arrhenius equation is admittedly old and well known in the rubber molding art, and has long been used for calculating the ideal cure time for rubber compounds.

The Arrhenius equation is presented, solved and the solution used in claim 1 to achieve the intended result of the claimed process—opening the mold at the proper time to avoid under-curing or over-curing the rubber. Although each time the computer solves the Arrhenius equation a number is obtained, unlike *Flook,* that number is not the end product of the claim. Rather, this number is then compared to a time factor—the amount of elapsed time since the mold was closed—to determine if they are the same. If not, the process continues to monitor the temperature and to calculate the solution to the Arrhenius equation at each temperature reading. There can be no question but that the mathematical algorithm embodied in the Arrhenius equation is *used* within the claim such that the claim, in its entirety, is drawn to a specific, limited and practical application of the principle to achieve a beneficial result in one of the technological arts. The claim is not drawn to the mathematical algorithm itself, but applies the mathematical algorithm in a specific manner to process steps to achieve a beneficial result.

Step (2) of the test is thus satisfied, *i.e.*, although a mathematical algorithm is recited in the claim, the claim as a whole is not drawn to the algorithm, but constitutes a specific *use* of the algorithm to a practical, beneficial end. Therefore, under the *Freeman-Walter* two-step test, so long as the claim is not otherwise non-statutory, claim 1 of *Diehr* defines patentable subject matter within the meaning of § 101.